

WHAT IS CLAIMED IS:

1. A process for producing a fatty acid ester from an oil or fat and an alcohol, wherein the process comprises reacting an oil or fat with an alcohol in the presence of a solid base catalyst under conditions in which at least one of the oil or fat and the alcohol is in a supercritical state at a temperature exceeding 260°C.

2. The process according to claim 1, wherein the solid base catalyst is a catalyst containing at least one selected from the group consisting of sodium carbonate, calcium oxide, calcium hydroxide, calcium carbonate and magnesium oxide.

3. A process for producing a fatty acid ester from an oil or fat and an alcohol, wherein the process comprises reacting an oil or fat with an alcohol in the presence of a nickel-containing solid catalyst under conditions in which at least one of the oil or fat and the alcohol is in a supercritical state.

4. The process according to claim 3, wherein the nickel-containing solid catalyst is a catalyst containing an oxide of nickel.

5. The process according to claim 1 or 3, wherein the alcohol is in a supercritical state.

6. The process according to claim 5, wherein the alcohol is represented by the following general formula (1):

R-OH

(1)

wherein R is a hydrocarbyl group having 1 to 10 carbon atoms, or a hydrocarbyl group substituted by a hydrocarbyloxy group which substituted hydrocarbyl group has 2 to 10 carbon atoms.

7. The process according to claim 6, wherein R in the general formula (1) is an alkyl group having 1 to 4 carbon atoms.

8. The process according to claim 6, wherein R in the general formula (1) is methyl group or ethyl group.

9. The process according to claim 6, wherein R in the general formula (1) is methyl group.

10. The process according to claim 1 or 3, wherein the oil or fat is a waste oil or fat.

11. The process according to claim 1 or 3, wherein the oil or fat is a waste edible oil.

12. A fuel comprising a fatty acid ester obtained by the process according to claim 1 or 3.

13. A fuel for diesel engine comprising a fatty acid ester obtained by the process according to claim 1 or 3.

14. A base oil for lubricant oil comprising a fatty acid ester obtained by the process according to claim 1 or 3.

15. A fuel oil additive comprising a fatty acid ester obtained by the process according to claim 1 or 3.